



## Missouri Solid Waste Diversion and Recycling Status Report For Calendar Year – 2001

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Solid Waste Management Program  
Planning and Fiscal Management Section

### INTRODUCTION:

The Department of Natural Resources' Solid Waste Management Program tracks the amount of waste Missouri diverts from landfills. Since 1990 a significant increase in the amount of diverted waste has been observed. This report will discuss the progress Missourians have made in diverting waste from landfills through the course of more than a decade.

### BACKGROUND:

Along with reporting on annual waste diversion and recycling progress, past reports have focused on providing information regarding development of a reliable methodology for determining estimates of annual waste generation in Missouri. The annual waste generation rate is the basis for determining the diversion and recycling estimates for the state. The department believes that its methods for estimating total generation, diversion and recycling rates are based on sound principle. Using these methods, the waste diversion estimates for calendar years 1990 through 2001 have been developed (see Table 1).

When the *Missouri Solid Waste Composition Study*, conducted by the Midwest Assistance Program, was completed in 1999 it indicated that approximately 59.6 percent of the waste stream was composed of Municipal Solid Waste (MSW). MSW is waste that is generated by households, institutions such as schools, office buildings, correctional facilities etc. and small business' such as restaurants and retail stores. The remainder of the waste stream consisted of construction & demolition waste (19 percent), industrial waste (12 percent) and other wastes (10 percent).

The study also provided statewide estimates for types of materials found in Missouri landfills. These estimates were essential for determining the MSW recycling rates for different types of materials. See Figure 1 for estimated MSW recycling tonnage rates for calendar years 1998 through 2001. The Solid Waste Management Program has estimated that for the calendar years 1998 through 2001, Missouri recycled a total of 9,020,234 tons of municipal solid waste.

One of the aspects of tracking waste in Missouri is assessing a *per capita* rate. Simply stated, *per capita* is a way to equally distribute or attribute something to each individual of a population. For solid waste management in Missouri, waste generation, disposal and diversion have all been tracked at a daily *per capita* rate in pounds (see Figure 2). Figure 3 shows the annual *per capita*

rate in tons. It should be noted that waste generation estimates consider all waste that is disposed of in Missouri's sanitary and demolition landfills as well as waste that goes to other states through Missouri's transfer stations. This means that when assessing a *per capita* rate for waste generation each individual is assessed an amount for all solid waste that is generated in Missouri.

## **DISCUSSION:**

Over an eleven-year period the *per capita* disposal has decreased from 1.33 tons per person per year to 1.11 tons per person per year rate. The lowest point during this period occurred in calendar year 1996 with a 1 ton per person per year disposal rate. The increase shown between 1996 and 2000 is attributed to a robust economy that provided an increase in personal consumption expenditures whereby per capita generation increased.

Per capita disposal may be used as a measurement to determine the success of information and education programs. When per capita disposal declines, the belief is that there may be less waste generation or that there has been an increase in waste reduction, reuse, recycling and composting activities. In general these activities require behavioral changes on the part of the public, albeit some decrease in generation is due to decreases in packaging at the manufacturer such as thinner aluminum cans and lighter packaging. For the most part it is individuals who make a conscious effort to purchase products with less packaging or with recycled content, place recyclable materials in a recycling bin instead of the trash can or to actively compost yard waste. These activities are behaviors that have a basis starting with an educational or informational program that addresses the issue and prescribes a direction for change to occur.

Table 2 compares Missouri's calendar year 2000 waste disposal and alternative methods to the eight states that border Missouri. The information in the table was determined using data provided from the December 2001 issue of *BioCycle* magazine.

Missouri's data includes tonnage from residential, commercial, institutional, construction, demolition and industrial waste streams. This waste is disposed of in Missouri's sanitary landfills, demolition landfills, or in landfills located out-of-state. The data from the bordering states may not include all of the waste streams that are represented in Missouri's data. Also, it is unclear whether the data from bordering states includes out-of-state waste disposal. In our experience, each state chooses its own method of calculating these figures; consequently they are not easily comparable.

While Missouri shows the highest per capita disposal rate of the nine states, its per capita recycling rate is significantly higher than that of the other states. It is thought that the increased per capita recycling rate partly is a result of a decade of reliable technical and financial assistance along with sound state and local planning that included educational activities that encouraged good solid waste management practices.

The traditional recyclable materials are also those materials falling under the MSW category that are typically consumed by and recycled by the general citizenship of Missouri, i.e. aluminum cans, plastic pop bottles and milk jugs, paper and steel cans. It is important to understand that there has been an increase in infrastructure development for collecting these types of recyclables.

Focusing on diverting from landfills non-MSW materials could have the benefit of reducing the per capita disposal rate.

Since 1992 the department has worked with Missouri's twenty solid waste management districts. These districts are provided funding to develop and implement local solid waste management plans. During that time, the number of communities in Missouri that have recycling collection services has increased from 154 in 1992 to 403 in 2000 (Figure 4). Yard waste collection services have also increased from 194 in 1992 to 311 in 2000 (Figure 5). A significant number of the services were provided directly through the efforts of the local solid waste management district's efforts through local grants and educational initiatives.

Funding solid waste activities encourages good solid waste management practices at all governmental levels and in the private sector, promotes the involvement of Missouri's twenty solid waste management districts in resolving regional and statewide solid waste problems, mitigates illegal dumping and educates the public about better disposal alternative. It is well known that convenient and economical recycling opportunities are key to public acceptance and participation in these programs.

Appropriate management of solid waste is needed and requires a variety of strategies including communicating what can be placed in a landfill and providing financial mechanisms to implement alternatives to landfills. This is accomplished through technical and financial assistance, encouraging waste reduction, reuse, recycling, energy recovery and improved processing and proper disposal.

Improper processing or disposal of solid waste can cause health and environmental problems such as ground and surface water pollution, air pollution and the transmission of disease. Without the regulation of solid waste disposal facilities and oversight of the implementation of local and regional solid waste management plans places the state's citizens, property and natural resources at risk. Overall, in the big scheme of things, Missouri is doing well with estimated waste diversion and MSW recycling rates at 41 percent.

# Summary of Missouri Waste Generation, Disposal and Diversion

<b>Year</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>
<b>Population</b>	5,117,073	5,157,507	5,193,872	5,237,867	5,281,280	5,226,784	5,358,692	5,402,058	5,438,559	5,468,338	5,595,211	5,629,719
<b>Missouri Solid Waste Generation (tons)</b>	7,540,000	7,623,009	7,844,367	8,107,229	8,411,596	8,563,780	8,771,303	9,048,000	9,227,853	9,559,890	10,288,232	10,607,167
<b>Solid Waste Disposal in Missouri Landfills (tons)</b>	5,400,000	5,269,846	4,751,816	4,731,633	4,075,174	4,124,753	3,640,337	4,118,739	4,464,357	4,570,496	4,759,493	4,960,600
<b>Solid Waste Imported From Other States (tons)</b>	Data not available	Data not available	Data not available	Data not available	Data not available	171,043	65,210	159,209	143,358	175,275	183,032	178,032
<b>Solid Waste Disposed of in Missouri Landfills (tons)</b>	5,400,000	5,269,846	4,751,816	4,731,633	4,075,174	3,953,710	3,575,127	3,959,530	4,320,999	4,395,221	4,576,451	4,782,568
<b>Solid Waste Exported by Missouri to Other States (tons)</b>	1,400,000	Data not available	Data not available	Data not available	Data not available	1,750,515	1,755,606	1,569,033	1,551,417	1,751,690	1,792,753	1,439,834
<b>Solid Waste Disposed by Missouri (tons)</b>	6,800,000	5,269,846	4,751,816	4,731,633	4,075,174	5,704,225	5,330,733	5,528,563	5,872,416	6,146,911	6,369,204	6,222,402
<b>Waste Reduction, Recycling and Composting (tons)</b>	740,000	1,180,614	2,046,723	2,483,566	2,559,503	2,862,555	3,440,570	3,519,427	3,355,437	3,412,979	3,919,028	4,384,765
<b>Percent Waste Diversion</b>	10%	15%	26%	31%	30%	33%	39%	39%	36%	36%	38%	41%

**Table 1**

## Recycled Municipal Solid Waste (MSW)

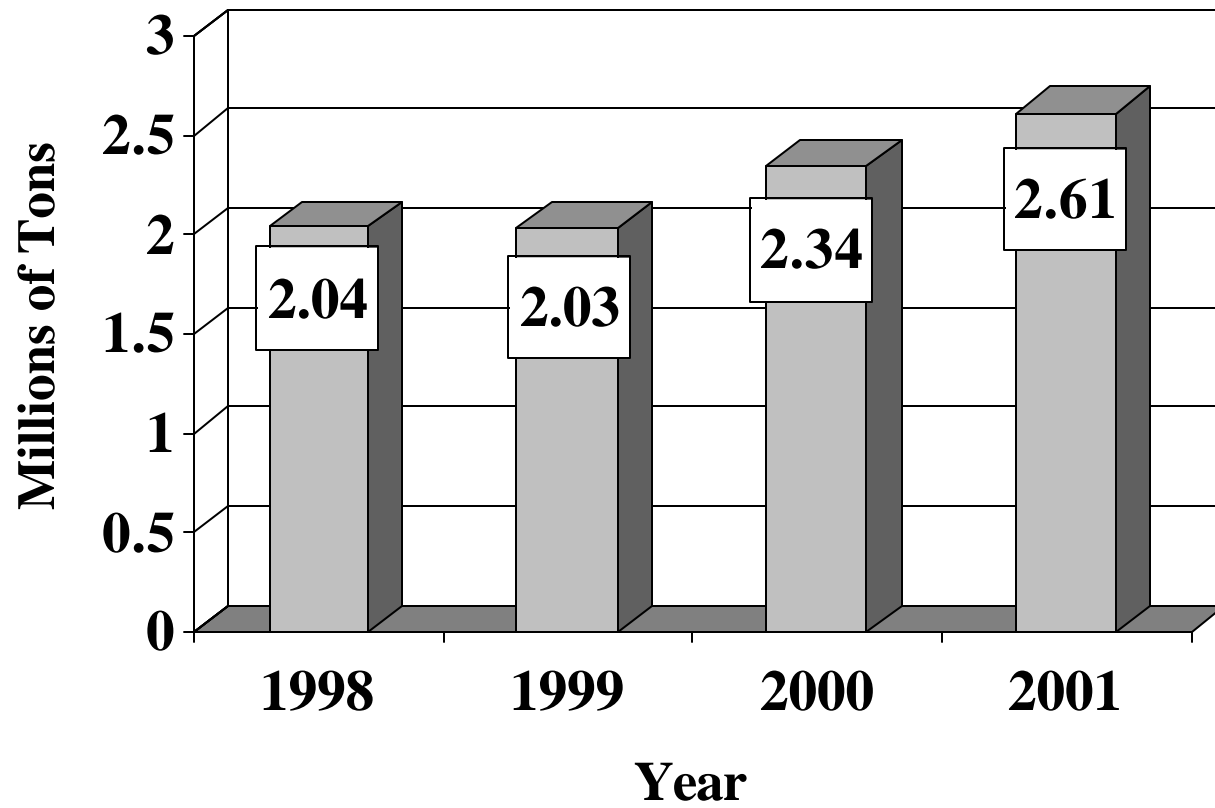


Figure 1

## Daily Per Capita Generation / Diversion / Disposal

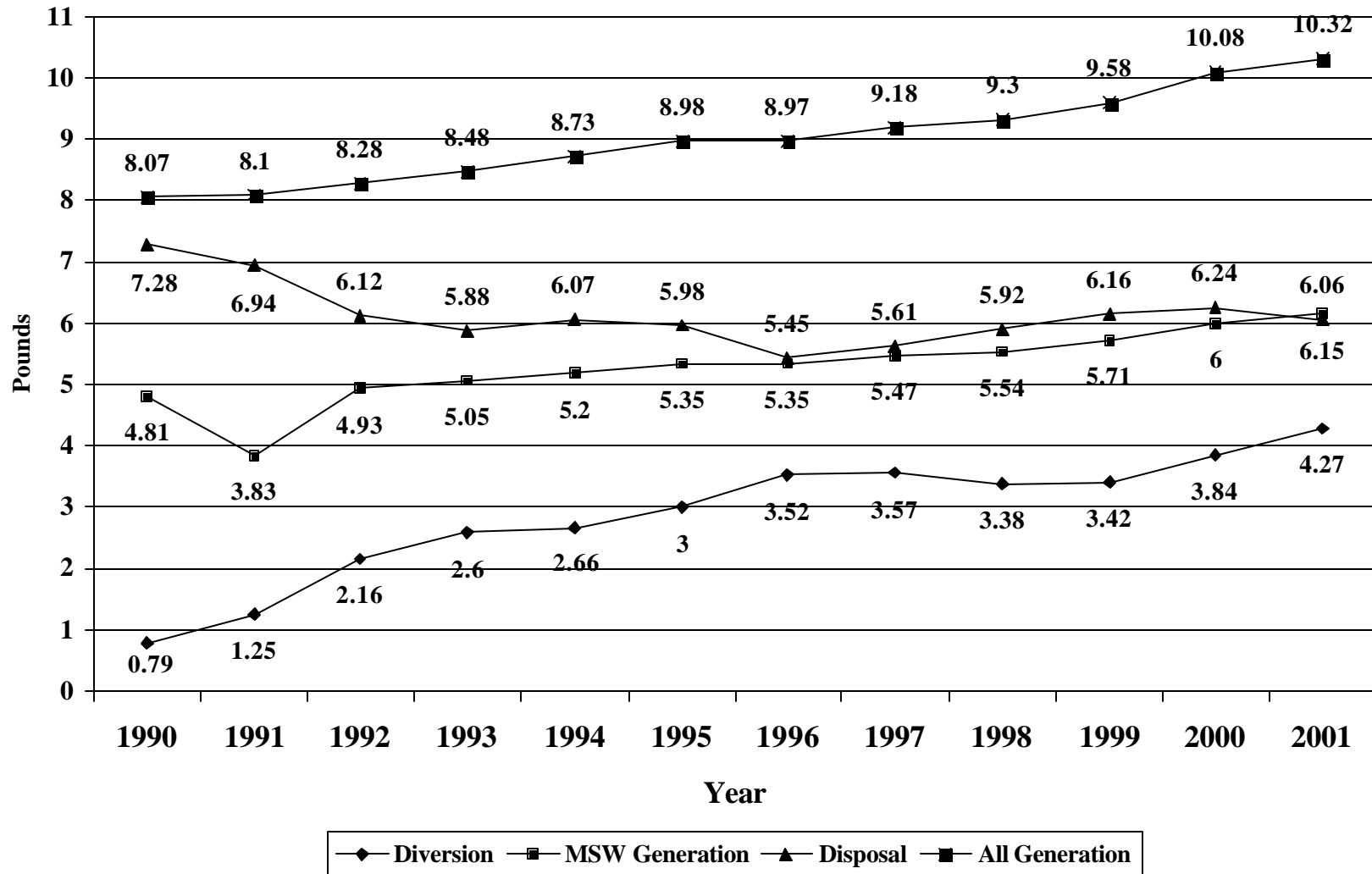


Figure 2

## Per Capita Disposal Rate of Solid Waste

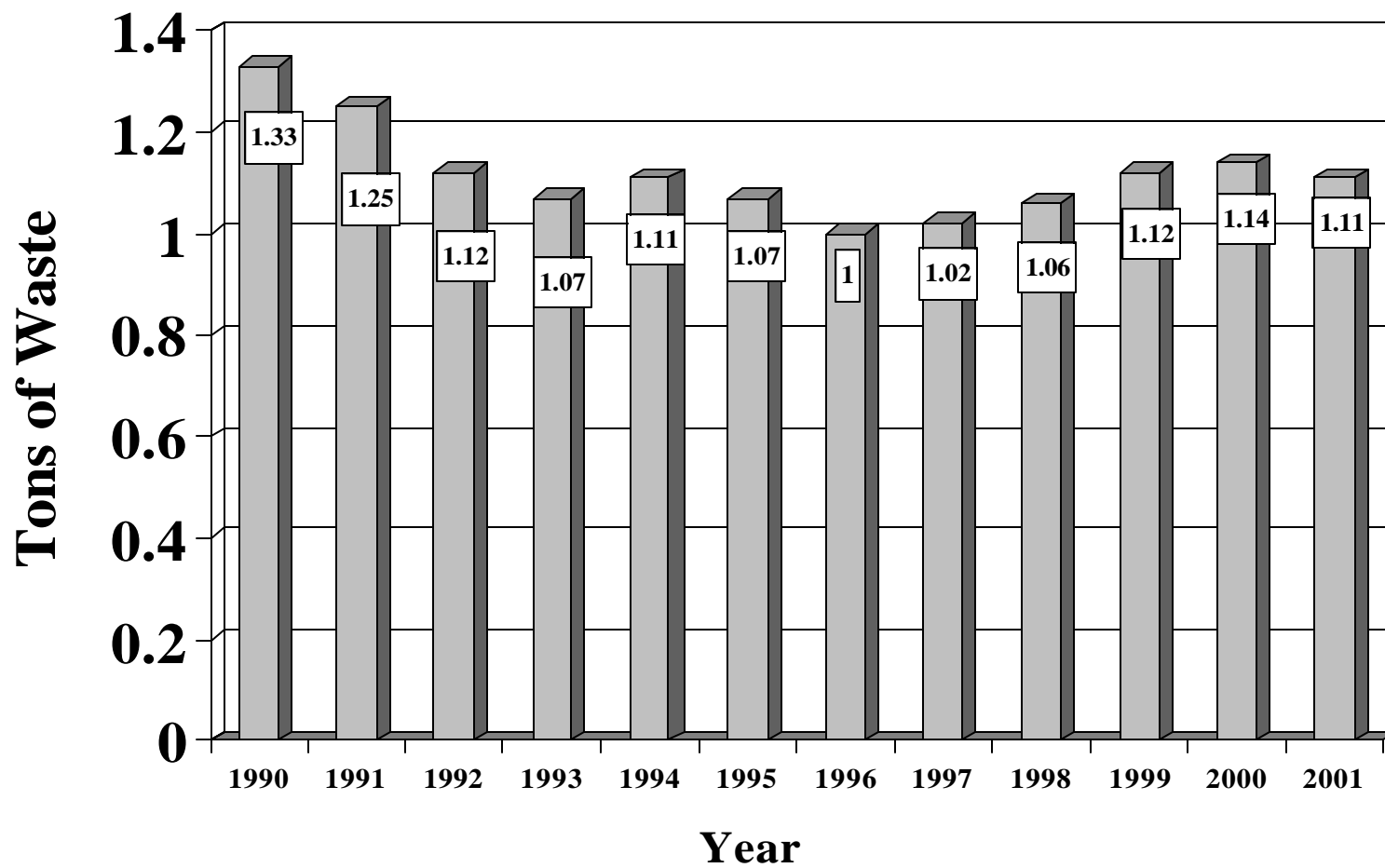


Figure 3

## **Annual *Per capita* Rates for Missouri and Eight Surrounding States**

<b>State</b>	<b>Calendar Year 2000 Population</b>	<b>Waste Generation (tons)</b>	<b>Per capita Disposal (tons)</b>	<b>Per capita Recycling (tons)</b>	<b>Per capita Incineration (tons)</b>
<b>Arkansas</b>	<b>2,673,400</b>	<b>2,056,000</b>	<b>0.42</b>	<b>0.35</b>	<b>0.01</b>
<b>Illinois</b>	<b>12,419,293</b>	<b>15,102,000</b>	<b>0.86</b>	<b>0.34</b>	<b>0.01</b>
<b>Iowa</b>	<b>2,926,324</b>	<b>2,866,000</b>	<b>0.64</b>	<b>0.34</b>	<b>0.01</b>
<b>Kansas</b>	<b>2,688,418</b>	<b>3,000,000</b>	<b>1.02</b>	<b>0.10</b>	<b>0.01</b>
<b>Kentucky</b>	<b>4,041,769</b>	<b>4,376,000</b>	<b>0.76</b>	<b>0.32</b>	<b>0</b>
<b>Missouri</b>	<b>5,595,211</b>	<b>10,288,000</b>	<b>1.14</b>	<b>0.70</b>	<b>0</b>
<b>Nebraska</b>	<b>1,711,263</b>	<b>1,848,000</b>	<b>0.83</b>	<b>0.25</b>	<b>0</b>
<b>Oklahoma</b>	<b>3,450,654</b>	<b>3,787,000</b>	<b>0.98</b>	<b>0.01</b>	<b>0.11</b>
<b>Tennessee</b>	<b>5,689,283</b>	<b>5,200,000</b>	<b>0.50</b>	<b>0.31</b>	<b>0.10</b>

**Table 2**



# Recycling Collection Services in Missouri Communities

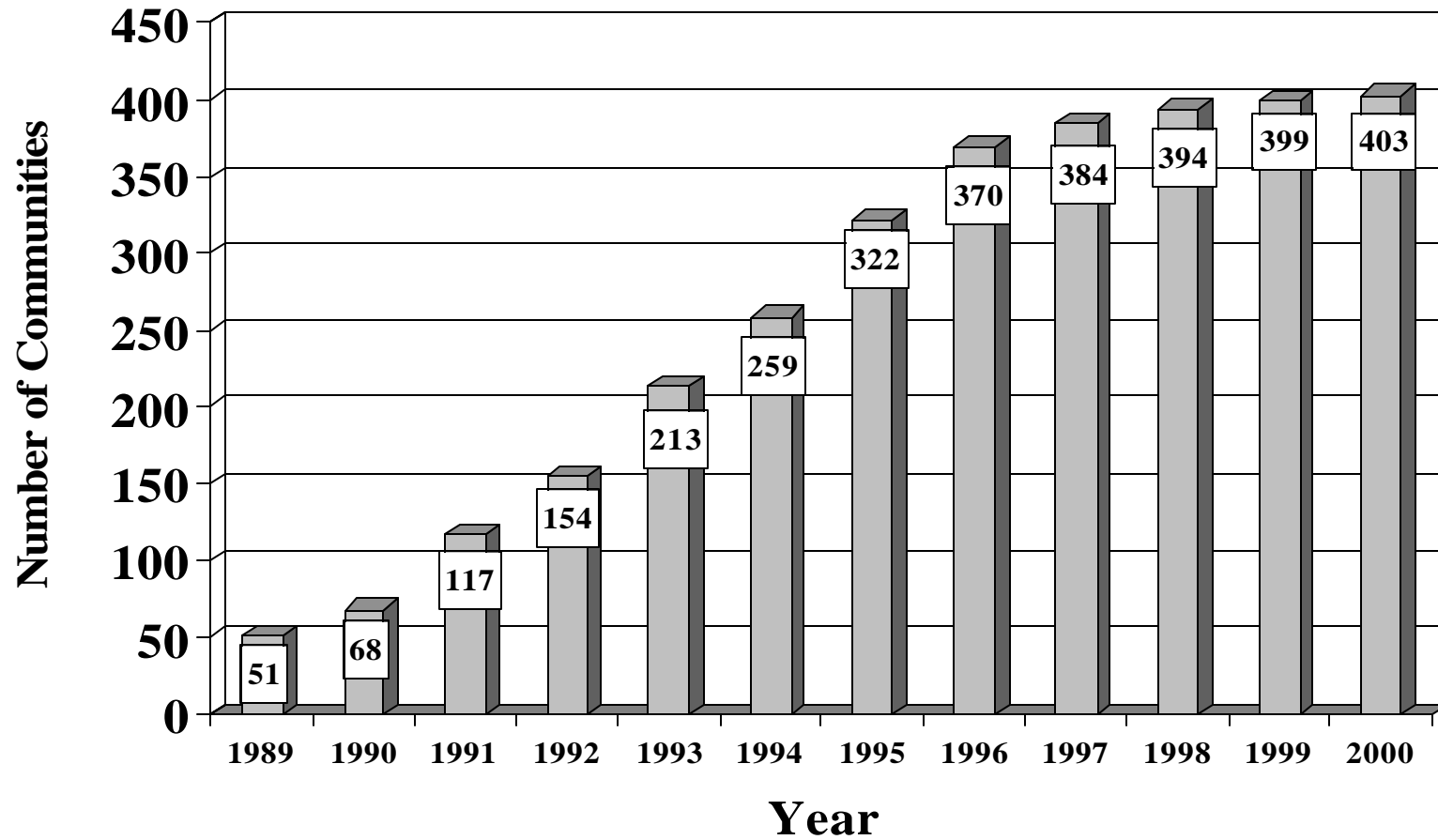


Figure 4

## Yard Waste Collection Services in Missouri Communities

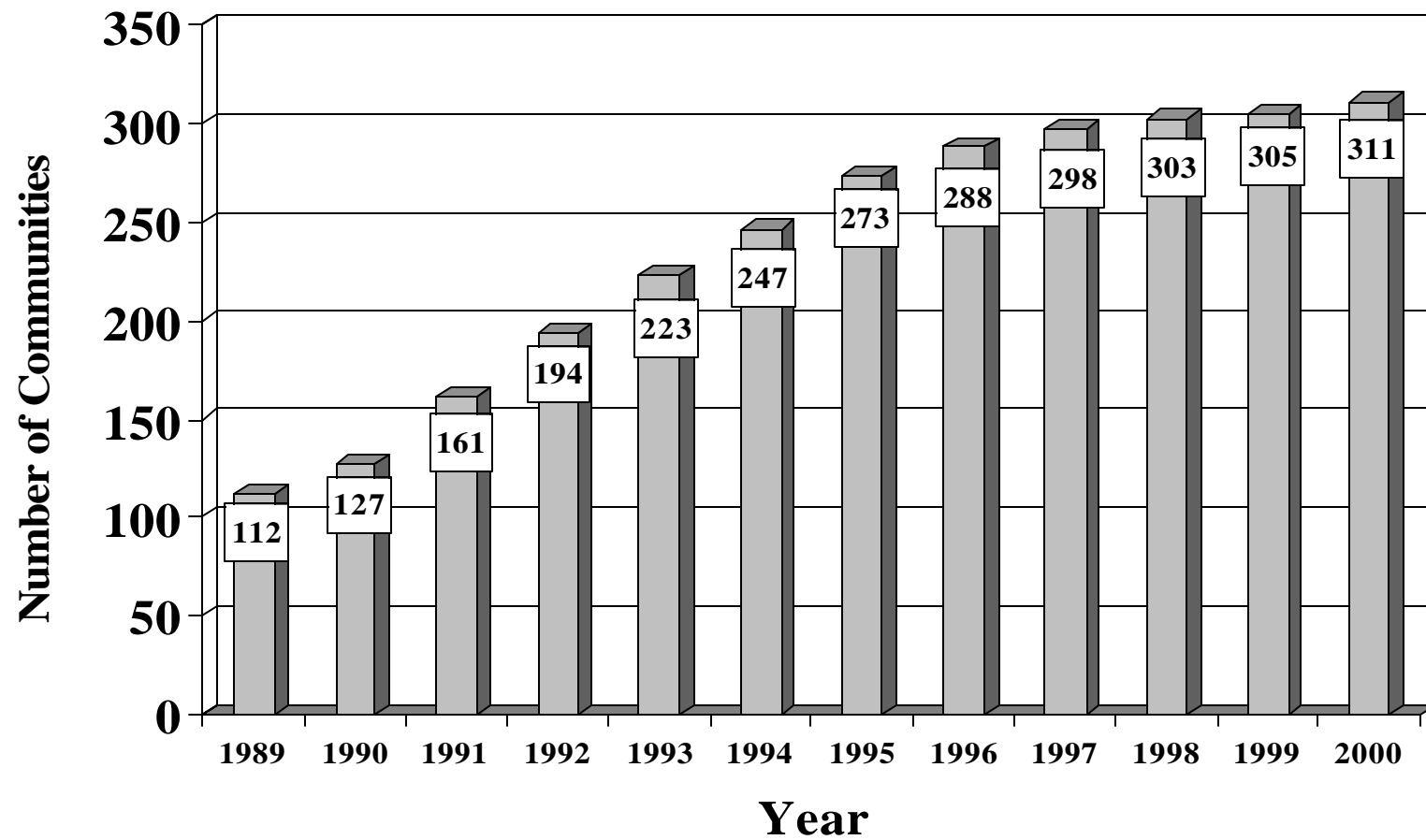


Figure 5